Journal of Forensic and Legal Medicine 16 (2009) 424–426

Contents lists available at ScienceDirect

Journal of Forensic and Legal Medicine

journal homepage: www.elsevier.com/jflm

Case Report

Unusual gastrointestinal causes of unexpected death in the elderly

Roger W Byard MD (Professor) *

Discipline of Pathology, Level 3 Medical School North Building, The University of Adelaide, Frome Road, Adelaide, SA 5005, Australia
Forensic Science SA, 21 Divett Place, Adelaide, SA 5000, Australia

ARTICLE INFO

Article history:
Received 31 March 2009
Accepted 2 April 2009
Available online 5 May 2009

Keywords:
Unexpected death
Elderly
Gastrointestinal
Hernia
Intestinal obstruction
Appendicitis
Diverticulitis

ABSTRACT

Gastrointestinal causes of sudden and unexpected death occur at all ages but are more common at the extremes of life. In the elderly quite significant disease may be present without observable symptoms and signs. Two cases of unexpected deaths due to small intestinal obstruction from unusual occult hernias are reported. Case 1: an 84-year-old woman was found dead lying in bed at her home address. Death was caused by intestinal herniation through a defect created by the greater omentum that had adhered to an area of acute serosal inflammation associated with underlying acute diverticulitis of the jejunum. Case 2: an 83-year-old woman was found dead lying on the kitchen floor at her home address. Death was caused by herniation of a portion of small intestine into a direct inguinal hernial sac that was occupied by an acutely inflamed appendix.

These cases demonstrate two uncommon causes of intestinal herniation associated with fatal outcomes. The underlying lethal gastrointestinal disease in both women was only identified at autopsy. As mechanisms of death in such cases may involve quite complex sequences of events, careful stepwise dissection of the intraperitoneal contents may be required to enable the accurate demonstration of underlying anatomical abnormalities that have led to fatal outcomes.

1. Introduction

A significant percentage of cases of unexpected death in elderly individuals involve a person who was living at home alone, who has generally not been seen by the neighbours for several days, and who is subsequently found dead. The most common cause of death is cardiovascular disease, either due to coronary artery atherosclerosis or the effects of hypertension. There are, of course, numerous other less-common diseases and conditions that may result in a sudden and/or unexpected lethal event. While younger individuals usually manifest symptoms and signs prior to collapse, elderly individuals sometimes may not show evidence of even quite severe and life-threatening disease. For this reason a variety of quite disparate conditions may present as apparent cardiovascular sudden collapse in the elderly, some of which may involve the gastrointestinal tract.[1,2] Two cases of unexpected death in elderly women are reported to demonstrate unusual gastrointestinal conditions associated with herniation and diverticulitis/appendicitis.

2. Case reports

2.1. Case 1

An 84-year-old woman was found dead lying in bed at her home address. She had a past history of hypertension, gout, urinary tract infections and treated breast carcinoma. At autopsy the most significant findings were within the abdominal cavity with numerous small and large intestinal diverticula. In the proximal jejunum one of the diverticula was filled with impacted vegetable matter and faeces with associated transmural and serosal inflammation. Two pieces of the greater omentum were attached to the indurated inflamed area of jejunum creating a hiatus through which 400mms of mid-small intestine had herniated. The herniated and proximal portions of small intestine were obstructed and filled with copious amounts of fluid brown faeces (Figs. 1 and 2). There had been no vascular compromise of the intestinal blood supply and there was no diverticulitis elsewhere. Histologic examination of the diverticulum revealed marked acute inflammation with transmural extension of polymorphonuclear leukocytes into the attached omental fat with microabscess formation. There was no evidence of recurrent or metastatic breast carcinoma. Although the carotid arteries showed significant bilateral atherosclerotic narrowing with previous bilateral ischaemic damage, there was no evidence of recent cerebral ischaemia. Death was due to small intestinal

* Corresponding author. Present address: Discipline of Pathology, Level 3 Medical School North Building, The University of Adelaide, Frome Road, Adelaide, SA 5005, Australia. Tel.: +618 8303 5441; fax: +618 8303 4408.
E-mail address: byard.roger@saugov.sa.gov.au

1752-928X/$ - see front matter © 2009 Elsevier Ltd and Faculty of Forensic and Legal Medicine. All rights reserved.
doi:10.1016/j.jflm.2009.04.007

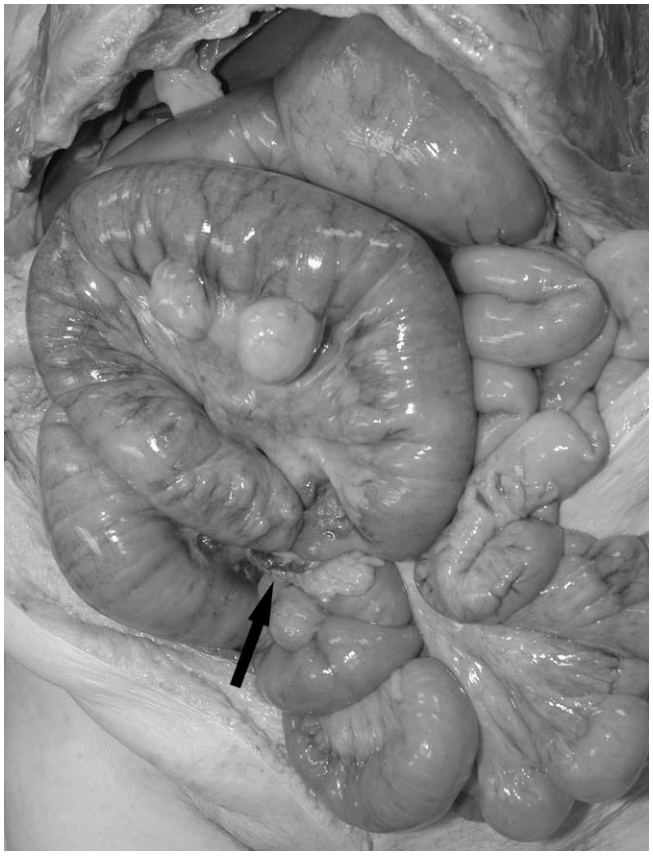

Fig. 1. Dilated loops of small intestine in an 84-year-old woman (case 1) with intestinal obstruction due to herniation through a hiatus formed by portions of greater omentum adherent to an inflammatory focus (arrow). Large diverticula can be observed on the mesenteric border of the jejunum.

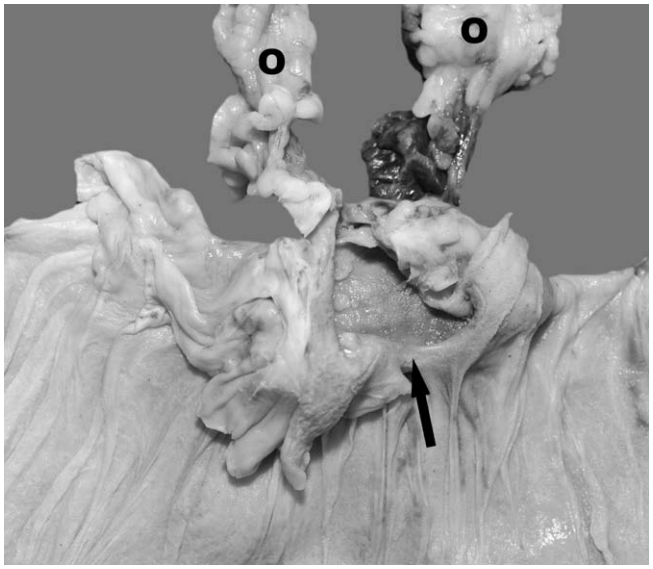

Fig. 2. Opened segment of jejunum with an arrow indicating the inflamed diverticulum. Two portions of greater omentum (O) can be seen attached firmly to the inflamed diverticulum.

obstruction caused by herniation of intestine through a defect created by omental bands complicating acute diverticulitis of the jejunum.

Case 2

An 83-year-old woman was found dead lying on the kitchen floor at her home address. She had no previous medical history. At autopsy the most significant findings were within the abdominal cavity with an irreducible right direct inguinal hernia filled with an inflamed distal portion of the appendix (Fig. 3). A 30 mm gangrenous segment of distal jejunum was also present within the hernial sac with obstruction of the proximal small intestine that contained copious amounts of fluid brown faeces (Fig. 4). Histologic examination revealed a marked acute inflammatory infiltrate of the distal appendix with transmural extension of polymorphonuclear leukocytes into the adjacent tissues with microabscess formation. There was also coagulative necrosis of the herniated portion of small intestine. Death was due to small intestinal obstruction caused by herniation of a portion of small intestine into a direct inguinal hernial sac that was also occupied by an acutely inflamed appendix.

There were no other significant organic diseases or injuries present that could have caused or contributed to death in either of the deceased.

3. Discussion

Both of the reported cases demonstrate several characteristic aspects of lethal disease in the elderly. Despite the presence of significant localized inflammatory lesions (diverticulitis and appendicitis) and intestinal obstruction, the victims had both failed to seek medical attention. This may have been due to a natural reluctance on the part of the elderly to visit health clinics and doctors. This tendency is seen in its most severe form in Diogenes syndrome where there is extreme reclusive behaviour with social isolation, very poor personal hygiene and hoarding of rubbish.[3] In addition, the elderly may have a reduced appreciation of pain and illness possibly contributed to by autonomic neuropathy. This is of significance in forensic practice as mechanical intestinal obstruction may progress rapidly to death without a diagnosis having been made.[1]

The cases also illustrate extremely uncommon causes of death, both with quite complicated sequences of terminal events. For example, in case 1 the background was of multiple small intestinal diverticula with focal acute diverticulitis. Small intestinal diverticulosis is much less common than distal colonic disease, but is believed to arise from similar mechanisms of intestinal dyskinesis with high intraluminal pressures. Diverticula form on the mesenteric edge of the intestine at points where mesenteric vessels penetrate the serosa. Although usually benign and asymptomatic, small intestinal diverticulosis may present with infection, perforation, haemorrhage or intestinal obstruction. More chronic problems include malabsorption, intestinal pseudo-obstruction and abdominal pain.[4,5] In case 1 diverticulitis had resulted in a serosal reaction with adhesion of portions of omentum to the inflamed areas. The defect created by the adherent omentum had then provided an orifice for the small intestine to herniate through leading to obstruction.[6] Death was, therefore, attributed to the effects of fluid and electrolyte disturbances from a small intestinal obstruction that had complicated diverticulitis. Despite significant carotid artery atherosclerosis with previous cerebral ischaemic damage this was regarded as incidental to the cause of death given the intraperitoneal findings.

In case 2 the tip of the appendix had formed part of an irreducible direct inguinal hernia. Whether acute inflammation of the distal appendix had preceded herniation or had followed it is unclear from the autopsy. Entrapment of a small segment of distal ileum with coagulative necrosis due to vascular compromise had then led to lethal small intestinal obstruction. Death was again attrib-

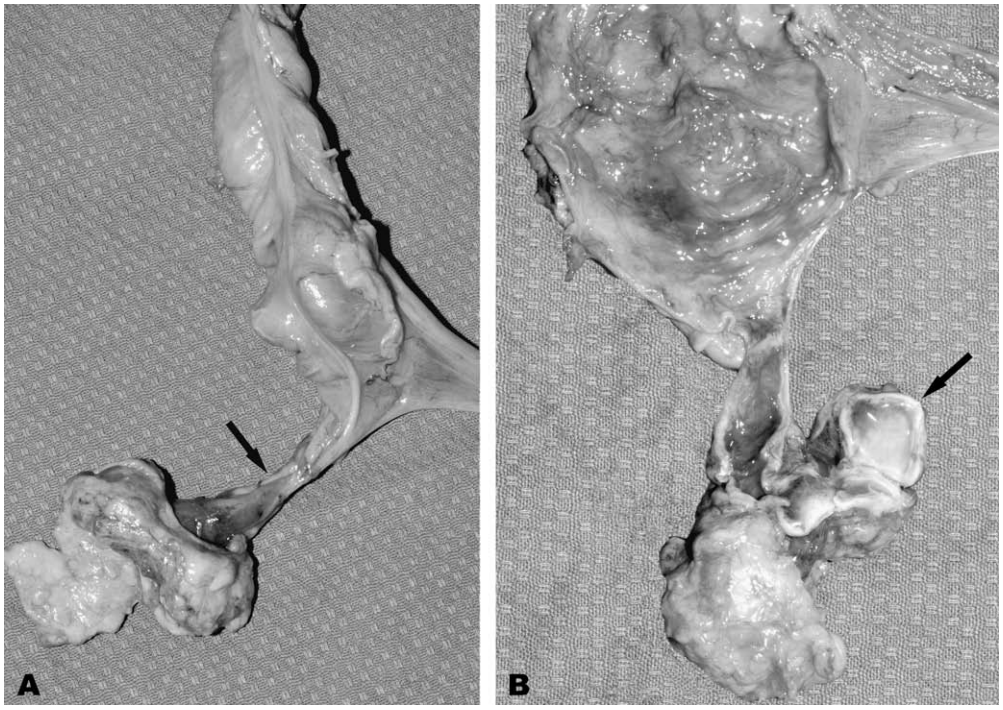

Fig. 3. The distal ileum, cecum and proximal ascending colon can be seen to be attached by the appendix to an excised direct inguinal hernial sac in case 2 (A). Opening of the intestines and appendix reveals a periappendiceal abscess cavity (arrow) (B).

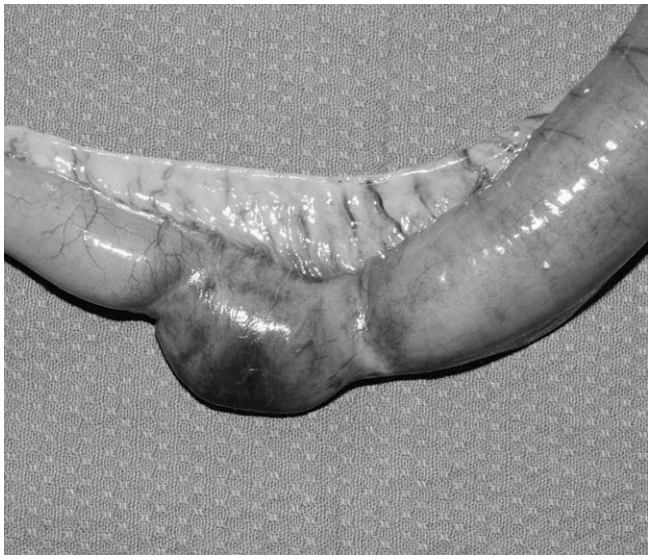

Fig. 4. Herniated portion of distal jejunum in the centre field (notched on either side) with an obstructed and dilated proximal small intestine to the right.

uted to fluid and electrolyte disturbances from obstruction that had complicated herniation of the appendix with acute inflammation.

4. Conclusions

These cases demonstrate that the presence of significant underlying disease, such as atherosclerosis, must not obscure the possibility of other less common causes of death in older populations; that small intestinal obstruction may be caused by mechanisms other than post-operative fibrous adhesions, with careful dissection required at the time of autopsy to clarify the precise nature of the underlying pathology; and that occult gastrointestinal disease remains a cause of unexpected death in the elderly that may only be revealed at autopsy.

Conflict of Interest

None declared.

Funding

None.

Ethical Approval

Not applicable.

Acknowledgement

We would like to thank the South Australian State Coroner, Mr. M Johns, for permission to publish selected details of these cases.

References

1. Pannell M, Byard RW. Sigmoid volvulus and unexpected death in the elderly. *J Clin Forensic Med* 2001;**8**:228–30.
2. Byard RW. Esophageal causes of sudden and unexpected death. *J Forensic Sci* 2006;**51**:390–5.
3. Byard RW, Gilbert JD, Tsokos M. Forensic issues in cases of Diogenes syndrome. *Am J Forensic Med Pathol* 2007;**28**:177–81.
4. Wilcox RD, Shatney CH. Surgical implications of jejunal diverticula. *South Med J* 1988;**81**:1386–91.
5. Ross CB, Richards WO, Sharp KW, Bertram PD, Schaper PW. Diverticular disease of the jejunum and its complications. *Am Surg* 1990;**56**:319–24.
6. Byard RW, Wick R. Congenital mesenteric anomalies and unexpected death. *Ped Develop Pathol* 2008;**15**:205–9.